

DEPARTMENT OF TRANSPORTATION**DIVISION OF ENGINEERING SERVICES**

Office of Structural Materials

Quality Assurance and Source Inspection



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Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 74.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-007254**Date Inspected:** 15-Jun-2009**Project Name:** SAS Superstructure**OSM Arrival Time:** 730**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**Contractor:** Goodwin Steel, UK**Location:** Stoke on Trent, UK**CWI Name:** Mr. Fred Hawksworth**CWI Present:** Yes No**Inspected CWI report:** Yes No N/A**Rod Oven in Use:** Yes No N/A**Electrode to specification:** Yes No N/A**Weld Procedures Followed:** Yes No N/A**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:** Yes No N/A**Approved Drawings:** Yes No N/A**Approved WPS:** Yes No N/A**Delayed / Cancelled:** Yes No N/A**Bridge No:** 34-0006**Component:** Cable Band**Summary of Items Observed:**

The following report is based on METS observations at Goodwin Foundry in Stoke on Trent and Goodwin International Machine shop in Trentham, England.

Magnetic Particle Testing

QA inspector observed, Goodwin Steel Castings NDT Level II technician Mr. Alan Banks perform Magnetic Particle testing (MT) of Cable Band casting GG29420-13, B3/M. The MT was performed in accordance with ASTM standard E709 and Goodwin Steel Castings Magnetic Particle Procedure for Cable Band Castings MT06-09-02 revision 1, using the prod method with leach magnet contacts. Wet florescent magnetic particles were utilized. The direct current magnetizing current appeared to be approximately 1,600 amps. Several relevant indications were located by Mr. Banks. These indications were evaluated by Mr. Banks in accordance with ASTM E125 and Goodwin Steel Castings Magnetic Particle Procedure for Cable Band Castings, MT06-09-02 revision 1. Indications found to be rejectable in accordance with MT-06-09-02 were marked for excavation and reported. The testing was not completed on this date and the Quality Assurance Inspector did concur with Mr. Bank's inspection results.

Repair

QA inspector witnessed repair welding of casting GG29430-1, B7/M as submitted in ABF-SUB-000366 Rev. 33. The welder was observed welding in the flat position utilizing approved welding procedure WPS04-0120F4B. Parameters were observed to be within the limits of the WPS.

Mechanical Testing

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The following tensile testing was performed by Goodwin Steel Castings Quality Control Technician, Mr. Rob Freeman. The testing was witnessed and completed today:

GG29417-4, Heat F7475 After PWHT

Yield Strength 452 N/mm²

Ultimate Tensile Strength 626 N/mm²

Elongation 25 %

Reduction of area 52 %

GG29417-7, Heat F7484 After PWHT

Yield Strength 473 N/mm²

Ultimate Tensile Strength 650 N/mm²

Elongation 17 %

Reduction of area 49 %

GG29417-9, Heat C7960 After PWHT

Yield Strength 436 N/mm²

Ultimate Tensile Strength 625 N/mm²

Elongation 29 %

Reduction of area 54 %

GG29417-10, Heat C7961 After PWHT

Yield Strength 438 N/mm²

Ultimate Tensile Strength 625 N/mm²

Elongation 20 %

Reduction of area 32 %

Elongation and Reduction of area unacceptable. Defect was found in test sample and retest is required.

GG29416-5, Heat C7947 After PWHT

Yield Strength 405 N/mm²

Ultimate Tensile Strength 587 N/mm²

Elongation 29 %

Reduction of area 56 %

GG29416-2, Heat F7465 After PWHT

Yield Strength 482 N/mm²

Ultimate Tensile Strength 655 N/mm²

Elongation 28 %

Reduction of area 52 %

GG29416-6, Heat F7497 After PWHT

Yield Strength 423 N/mm²

Ultimate Tensile Strength 610 N/mm²

Elongation 26 %

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Reduction of area 48 %

GG29416-8, Heat F7503 After PWHT

Yield Strength 459 N/mm²

Ultimate Tensile Strength 630 N/mm²

Elongation 22 %

Reduction of area 39 %

GG29416-10, Heat C7965 After PWHT

Yield Strength 407 N/mm²

Ultimate Tensile Strength 632 N/mm²

Elongation 28 %

Reduction of area 50 %

GG29420-16, Heat F7530 Initial test

Yield Strength 418 N/mm²

Ultimate Tensile Strength 629 N/mm²

Elongation 28 %

Reduction of area 52 %

GG29420-18, Heat F7529 Initial test

Yield Strength 432 N/mm²

Ultimate Tensile Strength 614 N/mm²

Elongation 28 %

Reduction of area 53 %

Visual Inspection by Certified Welding Inspector

The QA inspector observed Applied Inspections certified welding inspector (CWI) Mr. Fred Hawksworth performing final visual inspection of cable band welded repairs. Mr. Hawksworth performed a review of the final NDT reports and Weld Logs in addition to the visual inspection.

Mr. Hawksworth found the following castings acceptable.

GG29416-5 (B1/M) repairs as submitted in ABF-SUB-000366 Rev. 28.

GG29416-6 (B1/M) repairs as submitted in ABF-SUB-000366 Rev. 30.

GG29417-4 (B1/F) repairs as submitted in ABF-SUB-000366 Rev. 31.

GG29417-7 (B1/F) repairs as submitted in ABF-SUB-000366 Rev. 30.

GG29420-2 (B3/M) repairs as submitted in ABF-SUB-000366 Rev. 31.

GG29426-1 (B6/M) repairs as submitted in ABF-SUB-000366 Rev. 31.

GG29432-1 (B8/M) repairs as submitted in ABF-SUB-000366 Rev. 31.

GG29438-1 (B10/M) repairs as submitted in ABF-SUB-000366 Rev. 30.

The QA inspector observed Applied Inspections certified welding inspector (CWI) Mr. Fred Hawksworth performing visual inspection of cable band excavation maps. Mr. Hawksworth performed a review of the excavation NDT reports and in addition to the visual inspection of the excavations.

Mr. Hawksworth found the following castings acceptable.

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GG29416-8 (B1/M) repairs as submitted in ABF-SUB-000366 Rev. 34.

GG29436-1 (B9/M) repairs as submitted in ABF-SUB-000366 Rev. 35.

GG29417-9 (B1/F) repairs.

Fettle

Two Goodwin employees were observed removing riser material from the exterior surface of one Type 1 cable band casting and one Type 2 cable band casting. The material was removed utilizing an Oxygen Fuel Gas Torch method. Work was not completed on this date and appears to meet the minimum requirements of the contract documents.

Dressing

Two Goodwin employees were observed removing excess material from the exterior surfaces of castings GG29417-9, B1/F and GG29439-1, B10/F. The exterior surfaces of the castings were dressed by grinding. Work was not completed on this date and appears to meet the minimum requirements of the contract documents.

Radiography

No radiography was performed on this date.

The QA inspector reviewed radiographic film of casting GG29433-2, B8/1-F with Goodwin Steel Castings NDT Level II technician Mr. Ian Pointon. The film quality and weld quality were reviewed for compliance with Goodwin Steel Castings Radiographic Inspection Procedure RT06-09-020 revision 1. No unacceptable indications were observed. Radiography of this casting was not 100%, only the bolting flanges were radiographed. Mr. Jason Cross of Goodwin Steel Castings reported that the initial B8/1-F casting had been 100% radiographed and acceptable levels of shrinkage had been identified in the flanges. Prior to casting the second B8/1-F casting, the casting method was revised to reduce the possibility of shrinkage in the flanges. Mr. Cross reported that he was in the process of submitting a request for information to Caltrans to allow partial radiography of this casting. See attached digital images for radiographic locations and RADIOGRAPHIC FILM REVIEW SUMMARY-CASTINGS (TL-6030) for details.

Summary of Conversations:

During this visit, METS met with Mr. Jason Cross of Goodwin Steel Castings. The following topic was discussed. Mr. Cross stated he would review which cable bands have had the casting method revised after radiographic acceptance of the first casting and which areas of the following castings will be radiographed to verify the revised method. Mr. Cross stated that he would be submitting RFI's through American Bridge for approval of partial radiography of the revised castings.

Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Nina Choy, (510) 385-5910, who represents the Office of Structural Materials for your project.

Inspected By:	Lanz, Joe	Quality Assurance Inspector
Reviewed By:	Levell, Bill	QA Reviewer
